

THE
DEPARTMENT OF WOODLOT MANAGEMENT
MACDONALD COLLEGE
AND
THE MORGAN ARBORETUM
AND WOODLAND DEVELOPMENT ASSOCIATION



*Dr. Brittain initiates first
planting on the Canada Birch Trail,
May 15th, 1965.*

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ANNUAL REPORT

to MAY 31st, 1965

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MORGAN ARBORETUM AND WOODLAND DEVELOPMENT
ASSOCIATION

AT MACDONALD COLLEGE, P.Q.

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W. H. Brittain, Ph.D. (Cornell). D.Sc. (U.B.C.), B.S.A., LL.D., F.A.I.C.,
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A.R.C. Jones, B.Sc.F. (Tor.) M.Sc. (Syr.), R.P.F., F.E., Chairman.
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Arboretum

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THE DEPARTMENT OF WOODLOT MANAGEMENT MACDONALD COLLEGE

It is once again my pleasure to report the highlights of the year's activities to the membership. This report covers the period June 1st, 1964 to May 31st, 1965.

Membership

It is gratifying to record a steady increase in the number of annual memberships taken out in support of our programme, 170 this past year. Since only one-fifth of the Department and Arboretum budgets are received from the University it is obvious how vital the continuing growth in membership is if the Department's conservation and resources programmes are to expand and develop to meet the needs. All around us are signs of the growing pressures on the maintenance of the status quo with regard to resources and the protection of the outdoor environment against encroachment. Outstanding speakers in many fields are now making themselves heard on this subject. Stewart Udall, United States Secretary of the Interior, has called it "The Quiet Crisis" and "The Conservation Challenge of the Sixties." In his words,

"America to-day stands poised on a pinnacle of wealth and power, yet we live in a land of vanishing beauty, of increasing ugliness, of shrinking open space, and of an overall environment that is diminished daily by pollution and noise and blight."

The outstanding Canadian writer and conservationist Roderick Haig-Brown in a recent address to the Canadian Audubon Society pointed out:

"Seen against the whole background of increasing population, urbanization, wealth, prosperity, and automation, the trumpeter swans (protected birds which were found shot and abandoned) become simply one more clear-cut warning of change. We have come to the time when we need and deserve this intensive care and consideration instead of extensive exploitation (of our natural resources). We have to use the country, manage it, protect it, care for it, cherish it and love it. We shall not achieve this without a major change of attitude and thinking. . . . Until now, the North American ideal has been an aggressive, pragmatic, often destructive individual who crowds every rule and ethic in the effort to achieve. . . . We've got to change it, in ourselves and in our children. . . . We need now an informed, considerate and ethical approach in all our citizens, towards the land and all its values and creatures. We need a new spirit of responsibility, a new sense of the meaning of the land and the purpose of society, in all our people."

These statements, so ably presented, are becoming increasingly our concern. The support of interested corporations and individuals of our research and teaching of natural resources conservation is essential to the maintenance of an ongoing programme. As many of the members are aware, the Arboretum has felt the pressures of "progress" during the last 10 years in the form of the Quebec Natural Gas Pipeline and the

Trans Canada Highway which were each originally surveyed to pass through the centre of the property. The first was changed to follow along the west and south boundaries and the second, following three separate attempts, was diverted to its present location (largely due to the strong support of our membership and certain far-sighted provincial officers). Progress is now being felt in the form of an overpass to be constructed this autumn. This will solve the problem of College access to the Arboretum and north fields through an overpass of the Trans Canada Highway and Ste. Marie Road. This overpass is surveyed to pass just east of the existing entrance, and in doing so will remove the area landscaped with native plants as well as part of the Johnson Corner Nursery. Unfortunate as this development may be the Arboretum badly needs a safe entrance from Ste. Marie Road and it is hoped that this plan will provide it.

At the end of the year membership stood at a high of 701 individual and family memberships, 38 forest industry and associated company memberships, and 19 honorary memberships. A total of 170 new memberships were received this year. Thanks for the membership growth are due to the work of the President, the Directors and many others, who have contributed time and effort as well as funds to encourage and support the Association. In particular the generous contribution of the Canadian International Paper Company of an additional grant of \$10,000 announced at last year's annual meeting is noteworthy. While the work continues to "flourish like the green bay tree", to quote Dr. Brittain, unfortunately, despite this generous grant, the long-term financial picture is dark, as the reserve fund will soon be exhausted unless additional corporation support is forthcoming.

Staff

There have been no permanent staff changes made during the past year. However, a great deal of work has been done in an effort to follow the plans described at last year's annual meeting with regard to establishing courses in renewable resources management and development in order to train students in soil, water, wildlife, forestry, rural and outdoor recreation specialties. The announcement of a generous gift to support a wildlife biologist under the name of the Huntly Drummond Fund has given great impetus to these plans. Interviews of prospective candidates for this position have been carried out through the year and the successful candidate is Dr. J. Roger Bider from the Université de Montréal whose appointment takes effect from June 1st, 1965. We are looking forward to having Professor Bider with us. His interests are related to the problems of animal ecology on private lands and his wide experience, his course work, his contacts at the Université de Montréal, and his services, will be an asset to Macdonald College, this Department and the Arboretum wildlife management programme.

Since last June supported through a grant from the Department of Forestry, the Department has had the services of a forester, Richard Lord, for a woodlot survey. Mr. Lord has been carrying out a study of the attitudes of farm woodlot owners toward woodlot management in Soulanges and Huntingdon Counties in western Quebec. The survey involved the preparation and use of a detailed questionnaire and visits

have been made to 362 farm woodlot owners in the two counties. One hundred and eighteen non-resident woodlot owners have been circularized by mail. This is the first time that a major study of this depth has been made in the region and the majority of woodlot owners have never before received forestry information of any kind. On completion of the study it is hoped that a practical assistance programme can be implemented with the cooperation of the interested woodlot owners.

The research activities in the Morgan Arboretum have expanded most favourably under the able guidance of Mr. Dan MacArthur. His experience and competence in forestry research have been responsible for co-ordinating and pursuing the most promising lines of endeavour. These efforts this year have resulted in several research findings important to woodlot management which will reach the publication stage in the near future. We were all very distressed and concerned over Dr. Brittain's illness which hospitalized him this winter. However, I am now happy to announce that he is regaining his strength and has been actively planning and working on white birch during this tiresome (for him) convalescent period. He is up and around again, as much as his doctors' will permit, and was able to make the first planting on the Canada Birch Trail (see cover picture) in early May.

Once again we are indebted to the many Departments who have co-operated with us in various projects and demonstrations during the year. In particular we are grateful for the assistance of the Agricultural Engineering staff for their co-operation and assistance at the Fall Field Day when a fire protection pond was blasted and in the studies of vacuum pumping of maple sap which were most successful this spring. The Extension Department has been instrumental in informing the public through radio, television and news releases of the many phases of our extension work and most helpful in organizing the spring Maple field meeting to discuss "New Developments in the Maple Industry". The Department of Microbiology assisted us again this spring by sampling for bacteria and fungi in the maple tree taphole studies which gave promising results when using paraformaldehyde pellets to control microorganism growth. Thanks are also due the various specialists for their assistance in one form or another. In particular Dr. Dorothy Swales for her work on maintaining the signs and labelling of specimens on the Botanical Trail which runs from the Maple Corner up Hill Road and down Todd Lane, and for the continuing work of mounting the many specimens of white birch which come in from all parts of the country as a result of Dr. Brittain's interest in this species.

The office and Arboretum staffs have handled their multifarious duties willingly and well despite continually increasing demands on their time. The services to members, filing and correspondence have become very heavy and without their conscientious efforts and loyal support it would be impossible to carry on such an ambitious and diversified programme.

Arboretum

The Scientific Adviser, Dr. Brittain, took off on another flying collecting trip to add to his unique collection of specimens of native white birch for the Arboretum last August. A 10-day trip this past sum-

mer covered mainland Newfoundland and part of Labrador. Collections were made around St. Johns, St. Phillips, Mount Pearl, Ocean Pond, Gander, Gander Bay and Lewisport Roads, Notre Dame Junction and Gull Pond. From the mainland he flew to Goose Bay, Labrador, and collected near the communities of Goose Bay, the Northwest River Road and the Hamilton River. From there he travelled by canoe and Indian guide to Mud Lake and collected around this relatively old settlement, as settlements go, in this sparsely settled region. Following this quick jaunt, Dr. Brittain returned by air to Ste. Anne's where he immediately left by car with Mr. MacArthur on a trip to the Gaspé. White birch collections commenced at Valcartier and continued at Matane, along the Amqui road on the Matane River and around Gaspesia Park and at Mount Albert in the Park. Ripe seed and birch specimens were also taken near Murdochville, Nouvelle-Ouest, Mill Stream on the Matapedia River, and at the West River gate of the Gaspesia Pulp and Paper Company limits. No ripe seed was located in the vicinity of Percé Rock despite an intensive search and the party returned to Macdonald College. All of the specimens grown from these collections will be planted in the Arboretum and a few of them will eventually represent their particular region in the Canada Birch Trail.

Canada Birch Trail

This project has aroused considerable interest. Nevertheless, it excites so many questions that a special word of explanation seems in order.

The trail has been inaugurated as the contribution of the Morgan Arboretum to the Centennial Celebration. In its conception it is particularly appropriate to that great occasion, since the native white birch, more than any other tree, symbolizes the geographical variations in the component parts of our country. In its great local variability it is equally symbolic of the ethnic complex of our population.

The trail is composed of typical specimens of White Birch collected from each province and territory, from Newfoundland to Vancouver Island and as far north as Reindeer Depot at the mouth of the Mackenzie River.

In pioneer times, as today, this splendid tree lined the banks of our myriad lakes and rivers which formed the basis for an amazing system of inland water transportation, spanning the continent. The bark canoe — strong enough to carry cargo and light enough to carry around the rapids was the instrument of transport. It made possible the early fur trade, which played a crucial role in the making of Canada which, in due course, established her within her present political boundaries. This historic connection with our early development must, therefore, give it a special place in our regard. We at Macdonald College have a very special feeling for this enterprise, since the historic highway of the voyageurs flows past our very door. We are rather pleased that the conception of the trail originated with us and that we have been able to establish this lasting memorial, with all the vast amount of labour involved by our own unaided effort and with our own funds — though, to be perfectly frank, it was not because we did not unsuccessfully attempt to secure outside support. It will now remain a permanent memorial to this historic event. A brief descrip-

tion of this project entitled "The Canada Birch Trail" is available on request.

The "trail" is but a small part of the birch project. The trail itself includes only a small proportion of the forms collected, which are now planted on a common site in the Arboretum.

As would be expected the individual collections show wide differences in botanical characteristics, ecological requirements, wood quality and in other respects. The presence of strains and varieties with a faster growth rate than the average has been amply demonstrated and there is some evidence that others with superior wood quality exist. All this has special relevance where reforestation with this species is now being attempted in areas where it is practically the only commercial hardwood.

Winter injury

A very rare type of injury occurred during the past winter which affected a number of species, which had passed through the past seven to twelve winters successfully.

In the past injury has been caused by a variety of unfavourable conditions as follows:—

(1) Unusually severe winter weather. Some years ago the temperature dropped to minus 40° or 41° in parts of the Arboretum and University. The late Mr. Cleveland Morgan reported one case (*Rhododendron kobus borealis*) 60 years old which succumbed completely and a number of species were wiped out in the Arboretum.

(2) Unusually prolonged heavy drying winds in some seasons have caused severe damage to some species and "wind burn" even to hardy native trees, e.g. *Picea glauca*.

(3) During the past season we had a combination of a very dry season, so that the trees went into winter with very dry roots, combined with a very low snowfall, leaving the ground bare for long periods. Under these conditions there was abnormal winter soil evaporation resulting in root injury, the results of which were evident in many shallow-rooted trees and shrubs.

The following species which previously have been reasonably free of injury have been:—

- (a) killed outright — *Ulmus carpinifolia suberosa*, *Abies sachalinensis* (one of five), *Castanea dentata* x *C. mollissima* (one), *Tsuga mertensiana*, *Malus ioensis*.
- (b) badly damaged — *Prunus maritima*, *Betula nigra*, *Acer macrophyllum*, Slioka Heartnut.

Woodland improvement

Harvesting operations and stand improvement cuttings have been carried out during the fall and winter months in parts of management Blocks II, IV and XVII. Cut control is exercised by means of tree marking in advance of these operations. These cuttings follow the pre-

scriptions outlined in the Management Plan and are specifically designed for use in the different intensities of management studies for woodlot owners classed by various income levels. These studies prescribe differing silvicultural treatments depending on owner income class and woodlot cover type. In Block XVII a two-acre clear-cut strip was made on the east and west sides of Stile Road. Cuttings of this type demonstrate an elemental type of silviculture for the "farm" owner or "bread-and-butter" woodlot owner who must cut every year. The advantages of regulating his cutting by using the strip method to ration out his woodlot until a second crop grows in, as opposed to indiscriminate clear-cutting which is so commonly practised by the majority of these owners, is the object of this operation. From 2 acres cut in this fashion 57½ cords of wood were removed and the cut area has been left in good condition for rapid regeneration. It is hoped that a second cut can be made in this same strip in 20 years time.

In Block IV an area designed for demonstration for the "commercial" woodlot owner who, by definition, is considered to work his woodlot more conservatively than the "farm" owner, but still cuts it severely from time to time which leaves him with a woodlot that in species composition and size class lies somewhere between the farm and the third class — the "institutional owner". A diameter-limit cut using tree diameters that ranged from 11 to 16 inches depending on individual tree vigour determines the cut-or-leave trees. For example a low-vigour tree of 11 inches diameter or larger would be marked to cut, whereas a high-vigour tree making fast growth would not be marked until it was 16 inches or larger in diameter. The cut from Block IV covered 4.5 acres and yielded 156 cords of hardwood firewood.

The "institutional" owner generally holds a different type of forest from the above two classes. Because of his better income position (in some cases — a non-resident owner) he can afford to invest in his forest and build it up for future high-quality timber production, manage it for maple syrup production, or even plant trees. Marking guides for this owner are based on the best silvicultural methods for a climax or tolerant hardwood forest which he will have developed and makes use of the single-tree selection or partial cutting system found useful for harvesting this type of shade-tolerant forest. The cutting system creates the least disturbance to the species already established and encourages rapid growth of the next crop. Seventeen acres in Block II were laid out and marked as a demonstration of the single-tree selection system for the institutional owner and 133½ cords were cut in this operation.

Through the hiring of an additional man for the winter cutting operations a substantial increase in wood production was obtained this year. A total harvest of 5 cords of hardwood pulpwood, 36 cords of softwood, 228 cords of firewood and 87 cords of sugarwood, or a total of 259.4 standard cords, were produced from 23 acres of woodlands. 2,869 man hours were expended in these operations for an average of 11 man-hours per standard cord of wood produced. Considering that the major product is time-consuming firewood this speaks well for the efficiency of the woods crew.

Maple research and demonstrations

A successful season of maple research was conducted in 1965 al-

though syrup production was low compared with the last 10 years as shown below:

	<i>No. of Taps</i>	<i>Gallons of Syrup</i>	<i>Pds. of sugar/tap¹</i>
1956	3,753	189	0.46
1957	3,035	467	1.42
1958	3,251	432	1.22
1959	2,692	278½	0.93
1960	2,488 (150 P/L)	427½	1.58
1961	2,605 (480 P/L)	281	0.99
1962	2,626 (911 P/L)	309¼	1.08
1963	2,871 ² (916 P/L)	374	1.19
1964	2,793 ² (911 P/L)	353½	1.14
1965	2,850 (932 P/L)	250½	0.81
10-year average to 1965:		336.2 gallons	

1. Gallons of syrup times 9.2 divided by number of taps.
2. An extension of Middle Grove added 150 new trees.

Sap flow commenced this spring the earliest on record on the first of March. Fortunately because of the experimental work several of the sap collecting systems were already installed when this unprecedented flow commenced. As a result 40 gallons of syrup were made by March 10th before temperatures returned to their normal March levels. The remainder of March was cold and this continued into mid-April with poor results in terms of syrup yield, i.e. 250½ gallons of syrup for 968 man-hours. However, this unusual weather cycle did establish several important points with regard to sap production in the Arboretum; 1) This was the year to have all our trees on a vacuum pump on a drop pipeline together with paraformaldehyde (PFA) pellets in the taphole. In the grove where this vacuum equipment was set up an average yield of 5.3 taphole gallons of sap from 425 tapholes was obtained compared with 2.0 gallons from test buckets treated with PFA pellets and 2.3 gallons on the conventional bucket set-ups in all other groves. Compared with other groves hung on drop pipeline without vacuum the very best average yield per taphole obtained using PFA was just under 4.0 gallons and without PFA only 2.3 gallons. The test results are shown in Figure 1. The difference in yield between PFA and untreated lines showed up strongly at the end of the season. This is the first year (of three) that highly satisfactory production has been obtained using vacuum pumping. It is interesting to speculate that if the entire bush had been on vacuum an additional 200 gallons of syrup could have been harvested this season. The good results with vacuum can be attributed to several changes made to the system this year; the relocation of the vacuum pump, the use of a drop-line throughout the tubing set-up, the introduction of PFA in the tapholes and the relocation of some of the back tubing lines. The Department of Microbiology studied micro-organism growth in PFA treated and untreated tapholes by sampling for microbial contents of maple sap on three occasions during the flow period. Their results are shown in Figure 2. The difference in growth of fungi and bacteria between treated and untreated tapholes can have

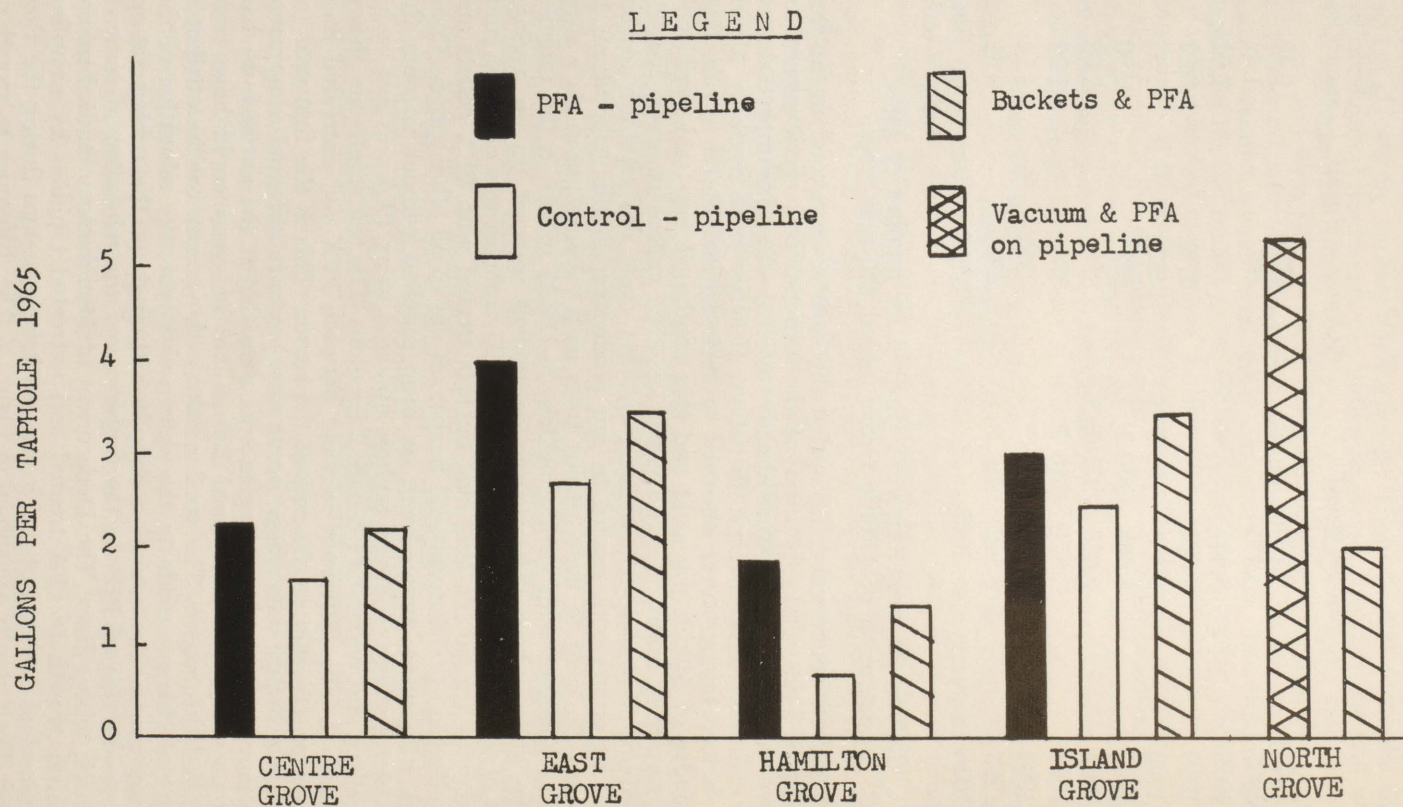


FIG. 1 Average Yields of Sap per Taphole by Treatments and Groves.

a very marked effect on sap quality and quantity in the latter part of the season — this can mean the difference between profit and loss in a poor sugaring year such as that just experienced.

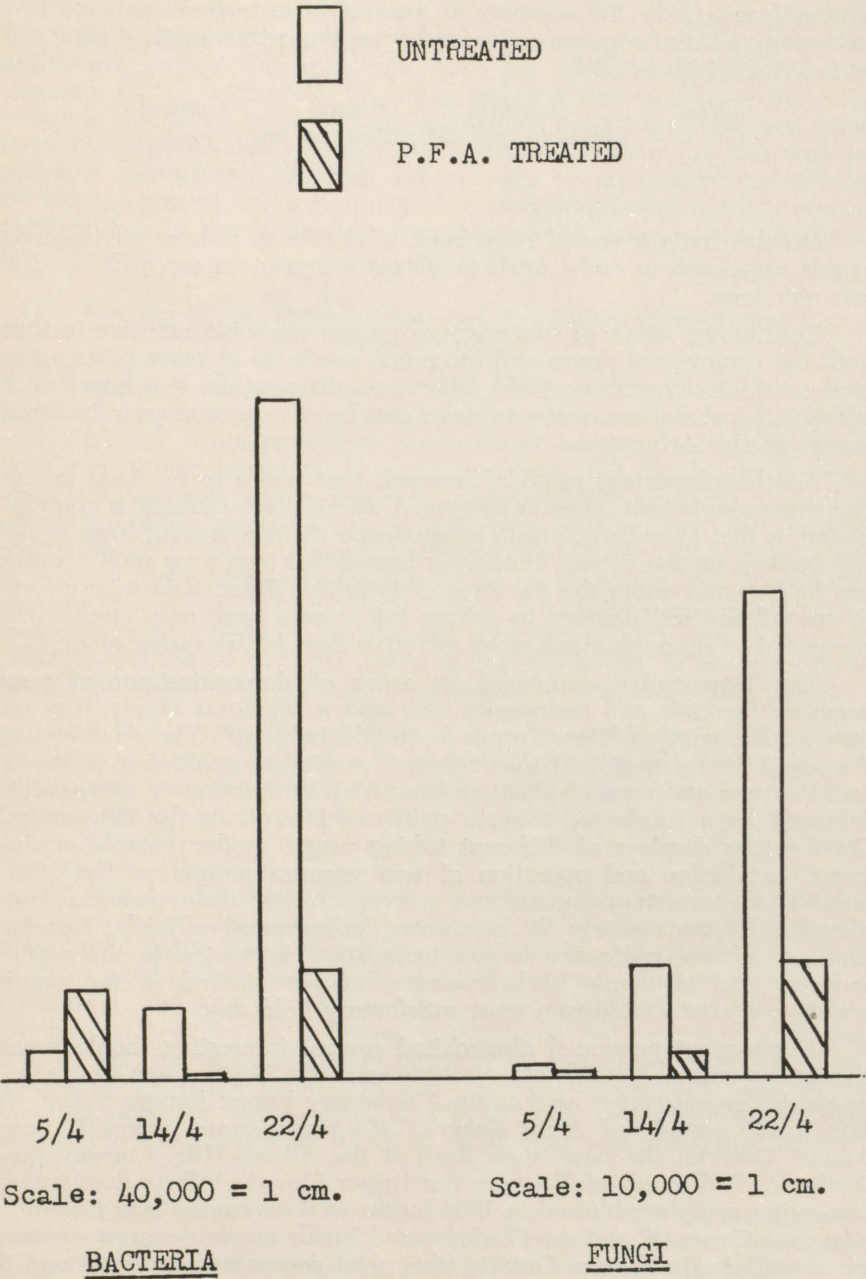


Fig. 2. Average Number of Organisms in PFA Treated and Untreated Samples of Maple Sap.

The unusual weather conditions this year provided an unique opportunity to study the variation in sap yield following a long freeze-up. The following treatments were made on tapholes that had "dried-up" after the early run: 1) new tapholes bored; 2) reaming or re-boring of the old taphole with an 1/16 inch larger bit; 3) rinsing the old tapholes with a Javex (1 to 10) solution; 4) control — untreated taphole. The following yields of sap were obtained from these treatments during the period April 14th to 28th:

<i>New</i>	<i>Reamed</i>	<i>Rinsed</i>	<i>Control</i>
— — —	<i>Yields in taphole</i>	<i>gallons of sap</i>	— — —
3.5	1.0	0.8	0.4

On this basis it would have been advisable to re-bore all the taps in our sugarbush in early April to obtain a maximum sap yield — this was not done.

Continuing trials of two vacuum pumps were inconclusive in that both the commercial pump and the pump made up of spare parts operated satisfactorily with no yield differences discernable. It is hoped that additional installations using vacuum can be set up next year in other groves in the Arboretum.

Another important piece of research that needs to be done in the Canadian maple belt where widespread use of plastic tubing is contemplated, is that of rodent control, in particular damage arising from squirrels feeding on the tubing lines. It is hoped that next year such a study can be initiated under the direction of Professor Bider. Extensive efforts to control squirrel damage to tubing this season were only moderately successful — although much more effective than in the spring of 1964.

The Department continued its work of demonstrations of new sugaring methods and techniques and held a bilingual Maple Day on March 11th, entitled "New Trends in an Old Industry". The short course discussed future trends in the industry, profitable marketing methods, and the pros and cons of plastic tubing from the producers' view-point, followed by a conducted tour to points of interest in the Arboretum. On the tour displays of different tubing usage, modern maple equipment, installation and operation of two vacuum pumps on flat land, covered evaporator operations and a syrup grading demonstration were observed. Approximately 90 producers, government officials, forestry and agricultural professionals and technicians interested in the maple industry and in maple bush management participated in the many events and contributed to a most satisfactory field day.

Department personnel also visited several interesting maple areas during the season. Notable among these were the "Visite d'une Érablière" research demonstration held at the Duchesnay Forest Ranger School in late April; a study of Amos Baker's 7,000-tap vacuum operation near Maple, Ontario; the new sugar bush at the Albion Hills Conservation Authority Park north of Toronto; the Upper Canada Village demonstration sugar camp established in 1964 by the St. Lawrence Parks Commission near Cornwall, and the Confederated Foods maple syrup processing plant at Delta in Eastern Ontario (this plant processes between 4 and 5 million pounds of maple sugar annually and is owned by United Maple Products); and a brief visit to Dr. Bob Morrow kept us up to date on Cornell University's maple research programme.

The usual three sugar parties kept our staff busy between sugaring and processing chores and fortunately the weather co-operated magnificently. The Arboretum party drew over 1,100 members and guests. The McGill Graduate Society party brought out close to 1,200 visitors to sample sugar on snow on April 24th. The members of the Macdonald College Faculty Club were treated to a successful evening sugar party. During the sugaring period an increasing number of school, pre-school and youth groups visit the sugar bush for educational purposes. The demands for such visits are becoming so heavy and so disrupt the work schedule that it has been decided to establish a demonstration area away from the experimental research areas and sugar house. In this way an effective educational sugaring exhibit can be maintained specifically for this purpose in line with our goal of providing better outdoor recreation services to the community and more youth conservation education opportunities.

Nursery Work, Reforestation and Plantation Management.
Nursery Work:

The spring activities centre around the members plant sale in early May and a most successful sale of plant material took place on May 7th and 8th. The Arboretum does not attempt to enter into competition with commercial nurseries. It could not even if it would. In growing stock for our own needs, however, we inevitably produce a surplus, which we make available to our members. Furthermore, we consider it part of our function to promote the use of suitable native trees, often ignored or underemphasized in favour of exotic plants. We do not discourage the use of exotic material, where it usefully supplements native material in any plan of landscaping. On the contrary our aim is to promote the use of varieties suited to our conditions, in order to avoid the all too common practice of using non-hardy and unsuitable plants.

This is a service that appears to be appreciated by our members. In particular, our sale and catalogue, which contains information on such points as hardiness, growth habits, points of distinction and other relevant matter, appears to have proved useful. This year's sale involved 115 orders and took in close to \$4,000 in receipts to help bolster Arboretum income. The plant sale occupies the full time of the staff during the spring period immediately following the end of sugaring. This has meant that there is no time for other work and no planting except the out-planting of white birch in the Senneville Field and the establishment of the Canada Birch Trail took place this spring. Permission to use a large field adjoining the Arboretum as a transplant nursery through the kindness of Mr. Bartlett Morgan was granted last year and after this area is worked up a number of larger trees and seedlings will be kept there until ready for future use. This land has temporarily relieved the pressing need for more space in the 10 acres of permanent nursery and will be most useful for many of our nursery and plantation research projects.

Over the years we have inevitably gained considerable information on the problem of different so-called types of "winter injury" and the conditions under which they occur, since we have experimented not only with native Canadian species, but with exotic species which might possibly survive in our climate. In our experiments with fall and spring planting, both of which may be quite successful, we have found,

in general with both evergreens and deciduous trees, that spring planting is safest. One condition that militates against fall planting is a very dry autumn and, when this is combined with a very low snow fall, as during the past season, the results may well be disastrous, especially to shallow rooted plants or those that are not well established. Evergreen species seem to be particularly susceptible to this type of injury. In the season of 1964-65 the deep penetration of frost also inhibited spring planting, cutting very short the usual transplanting season.

Reforestation and plantation management

Reforestation of the open areas is now complete with the exception of a small area in the Senneville Field. The growing collections of white birch are being planted here to serve as a living collection or source for this unique plant material collected from all parts of Canada.

Shearing to shape the Scotch pine varieties as well as red and white pine in the Christmas Tree trial plantations was carried out last summer using the new knife and hedge shear techniques to compare their effects on tree development. The Arboretum Christmas tree sales and studies are attracting considerable interest and in a marketing test using Scotch pine wrapped in Vexar plastic mesh (to reduce breakage and handling damage and package the product) close to 1,000 Scotch pine Christmas trees were sold last December.

Pruning of lower branches was undertaken in two areas last summer and fall. White pine in the Pine Field were low-pruned to increase air movement through the plantation as a protection against blister rust attack, and red pine stands in the Pine and Sand Fields and Johnson Corner were pruned to eight feet to produce boughs immediately for bundles for Christmas sales and eventually knot-free timber. Red pine bough sales result in clean-pruned plantations that are less susceptible to fire and beetle damage and more readily visited for inspection. 566 trees were pruned to produce 567 bundles at a labour cost of 37 cents per bundle (pruning 17¢ per bundle — bundling 20¢ per bundle). These bundles packed in Vexar plastic mesh plus 41 purchased from a neighbouring plantation added considerably to the income from Christmas tree sales and are becoming increasingly popular for decorative use.

The plantings of pines for Christmas trees and those of hybrid poplar cuttings in the spring of 1964 were all successful with one exception. The new poplar cuttings planted on the Quebec Natural Gas pipeline did not do well in this first season.

Thinning of older plantations, through sales of thinned trees, roots and all, has not progressed as rapidly as expected to date. However, a few sales of 15 to 20 trees have occurred. Second thinning can no longer be delayed in the excellent mixed Norway spruce and larch plantation and this will commence this summer.

Plantation research

1. *Wetlands Planting*: Data are still being accumulated annually and the first formal report on growth and mortality is planned for 1965.
2. *Hybrid Poplar Planting*: Some strains are beginning to show marked superiority, but it is too early to make any final selections.

3. *Hybrid Larch Fertilization*: With the initial stage, the fertilization study, completed, the plantation can now be placed under management to study the production of this species under Canadian conditions, but it has not yet reached thinning age.
4. *Birch Leaf Miner*: Interesting results were obtained in the first year of the formal study of the population dynamics of this insect. The Department of Entomology will continue this work to completion. The formal study will continue in the Johnson Corner Nursery and be extended to the Senneville Field birch collections. Incidentally it was found that the systemic poison tested (Di-Syston) gave almost 100% control of leaf damage.
5. *Study of the Cytology of Birch*: This work, now supported this year by a Macdonald College Research Fund grant, will be actively pursued and it is hoped that results will, among other things, aid Dr. Brittain and Dr. Grant in working out some of the taxonomic problems. A first research paper co-authored by Dr. Brittain and Dr. Grant has been accepted by the Ottawa Field Naturalist (in press) entitled: "Observations on Canadian Birch at the Morgan Arboretum. I. *Betula papyrifera* in Eastern Canada."
6. *The Hardwood Plantations*: Since the Morgan Arboretum is in the lead with the planting of hardwoods, and since information on this subject in Canada is extremely limited, it is felt that an effort should be made to report on results without delay. Such a report, in a historical format, would be helpful to others interested, but not experienced, in hardwood planting.

Teaching, adult education, and conservation

The regular courses in Woodlot Management and Farm Forestry were held during the fall term with a total of 33 students registered. These courses provide the student with the resource background and impart the important principles of woodlot forestry practices in Eastern Canada. Case examples are emphasized through numerous practical projects undertaken in the Morgan Arboretum, and by field trips made to the Canadian International Paper Company's Harrington Forest Farm and the Arundel High School Tree Farm. The willing co-operation of these organizations in arranging visits is gratefully acknowledged. Field trips such as these add immeasurably to the students' depth of knowledge and experience in practical forestry problems.

Thirteen students elected woodlot and related projects in the 2-day agricultural tour which precedes the commencement of third year. The tour takes the students on a flying trip through the southern farming and forestry regions of the Province. These projects require, with the aid of the appropriate staff member concerned, a scientific report on some aspect of resource use in the areas visited. This is frequently the first chance the student has to prepare a properly documented scientific paper.

The Diploma students, in addition to their regular course in Farm Forestry, have the option of carrying out a woodlot project on the home farm. This year Warren Grapes of Sawyerville won the Vernon E. Johnson Woodlot Award for the best executed farm woodlot project.

Mr. Grapez selectively thinned several acres of second-growth maple woods to improve the crowded conditions in the stand and aid the woodlot's rapid development into a commercial sugarbush. This is the sixth year that this award has been made and the treated woodlots are beginning to serve as useful demonstrations of the value of thinning second-growth forests.

The continuing demand for information, tours, field inspection, and correspondence is a never-ending daily chore. This service involves everything from guided tours and short courses, to answering telephoned requests or helping visitors who come into the office with the offending branch, leaf or tree. Now that a wildlife professional is on the staff we can expect such visits and requests to include fauna as well as flora. As an example a junior naturalist telephoned this spring to ask permission for bird photography in the Arboretum. The request was followed by the question, "My mother wants to know if you have seen any rabid foxes in the Arboretum lately?"! He was reassured that we have yet to see a rabid fox in the Arboretum — although we would dearly love to see some healthy foxes to help control the increasingly bothersome rodent populations.

Extension activities in addition to the widespread dissemination of forestry literature during the Soulanges and Huntingdon Counties surveys involved numerous radio broadcasts on points of interest in our woodlot, sugaring, and Christmas tree studies as well as information on conservation and short courses underway. Four television broadcasts have been made emphasizing in particular the sugaring and Christmas tree methods under study in the Morgan Arboretum. Numerous educational tours of the Morgan Arboretum as well as demonstrations have been conducted. These tours included the Ottawa and Baie d'Urfé Horticultural Societies, the Ontario Junior Farmers, the Rural Sociologists of America, an Indian Community Leadership course, The Canadian Institute of Forestry national executive, and The Conservator and Assistant Conservator of Forests from Kenya. Numerous scout, guide, cub brownie and school classes, as well as small groups of scientists interested in their respective fields of specialization, as well as the Maple Day seminar in March, and a fall Forestry Field Day, included tours. This last event is reported as follows:

"The fourth annual Forestry Field Day attracted an estimated 400 visitors to the Arboretum on November 7th. The meeting was attended by members of the Association, students from the Woodlot Forestry evening class held annually by the Department, members of the Canadian Tree Farmers' Association, the Champlain Section of the Canadian Institute of Forestry, the Rouge River Valley Association, and representatives of forest industries.

"The programme opened with the boom of a pond blast and closed with the bang of the explosive splitting gun. Between these "fireworks" visitors watched slightly less noisy demonstrations of fire control equipment, chainsaws, snow-travelling vehicles, and an ingenious amphibious vehicle. From the Chalet staff flew the new Arboretum flag made and donated by Mrs. Stewart Forbes and inspired by the white-barked birches of Canada. This flag symbolizes the interest of the Department and the Association in Canadian forests.

"The 1964 "instant pond", intended mainly as a water source for firefighting but also as an attraction for wild life, was the third to be blown since 1962. Amex II, a cheap explosive mixture of nitrogen fertilizer and fuel oil, digs an 80,000-gallon pond for \$100 to \$150 or 22 cents per cubic yard excavated — about half the cost of mechanical excavation. Other advantages are 1) explosives can be used in areas inaccessible to heavy digging machinery; 2) the excavated soil is spread by the blast, and 3) improved drainage.

"The ponds have been blasted by Professor Bob Broughton, a specialist in agricultural engineering. He emphasizes that ponds can be constructed only in slow-draining soils where there is enough seepage and run-off water to fill them, and warns that one should not attempt to mix the blasting material. This type of pond is not generally suitable for stock watering without additional work.

"To date the ponds have been quite satisfactory. Fluctuations of water levels have not been serious, there has not been extensive sliding-in of the sides and as natural vegetation appears on the banks their appearance has continued to improve.

Fire Protection

The commonest fire hazards to farm woodlots, plantations, fields and other property are grass and brush fires. The fire control demonstration was arranged to show some cheap, effective, durable, and easily maintained and operated equipment for dealing with such fires.

Portable hand-operated pumps (a 4½ gallon knapsack polyethylene reservoir plus hand pump) were demonstrated on a brush fire. In fighting grass fires these units are used in conjunction with special fire rakes for establishing a fire line. The efficiency of the hand pumps can be boosted by the addition of a chemical wetting agent that makes the water wetter (at least three times more effective). This can be especially important where water is scarce or in the initial attack on a fire.

Also shown was a portable power unit delivering four high pressure streams of water and able to supply hand pumps by an ingenious draw-off arrangement ("water thief") near the fire. The Wajax Equipment Company now supplies re-conditioned power units of this type with a complete set of accessories for about \$400.00. This, plus several fire rakes and five or six hand pumps could provide the solution to the fire protection problems in rural areas.

Machines and Tools

Various models of Homelite chainsaws and brushcutters were displayed, demonstrated, and tested by visitors. A special thrill was provided by the twelve-pound Super XL-12 mechanical saw which even ladies and children could start and use without undue effort.

Young and old kept the snow-travelling Hus-ski, the Bombardier ski-doo, and the amphibious Jiger under continuous test, despite the absence of snow!

Forestry tools for a wide range of jobs were on display at Chalet Pruche where they were examined and discussed until Professor Jim Cooper split a large log using the explosive splitting gun to mark the end of the programme.

The large attendance indicated the growing interest in woodlot management and the value of the Morgan Arboretum as a study centre where practical applications of woodlot forestry can be displayed and promising techniques and equipment brought to the attention of potential users."

Besides these field days and tours the adult education effort has been confined to the ninth Woodlot Forestry Conservation course at McGill; a community school at Magog; a Conservation Pack Scouters course in the Arboretum; slides shown at the Association's annual meeting; assistance to the Quebec Agricultural Marketing Board meeting in Arundel, and numerous addresses to Service clubs; to high schools on careers; to the Provincial Scout Council and Girl Guides Training course at St. Margarets on conservation; and a paper on "Woodlot and Sugar-bush Management" to the Eastern Townships Forestry Association; and an invitational seminar "Private Forestry in Eastern Canada" presented to graduate students and staff of the New York State College of Forestry at Syracuse, by various members of the Department. Several short articles or interviews on the different aspects of woodlot management and conservation have appeared in *Time*, *The Lakeshore News*, *The Montreal Star*, *The Country Guide*, *The Family Herald*, and the *Macdonald Farm Journal*. The second series of Conservation Badge Training courses is now underway for Montreal District Scouts with the co-operation of the Department and other Macdonald College staff members. These courses use the Arboretum for practical field projects and demonstrations. A visit was also made to the Albion Hills Conservation School north of Toronto where Principal Malcomson toured us around his fine new facilities for teaching conservation matters through out-of-doors field work to high school pupils and teachers. This year the Albion Hills School is initiating the first summer school training session in Natural Resources for teachers entitled "Conservation and the Outdoor Environment". It is sincerely hoped that subject matter such as this will soon be available to all high school graduates.

This fall the Woodlot Conservation course is to be held at Macdonald College commencing September 30th. The twelve-lecture course covers the following subjects: Tree Identification, Woodlot Protection, Silviculture, Reforestation, Plantation Management, Water Conservation, Wildlife Management, Landscaping with Native Plants, Mapping, Wood Measurement, Woodlot Management (including the sugar-bush) and Marketing. Four field trips are included in the course.

Members of the Department have attended many meetings and conferences dealing with renewable resources during the year. Our staff attend these meetings because of their competence in the field under review and the valuable contribution they can make to the discussions. Notable among these meetings were the Ontario Christmas Tree Growers' Association at Mono Mills, Ontario, The Rural Sociologists of America and the Committee to study the Sociological Aspects of Resource Conservation, The Logging Research Associates demonstration at Lac Carré; La Corporation des Ingénieurs Forestiers annual meeting in

Quebec; the Arundel High School Tree Farm annual meeting at Arundel; The Canadian Tree Farmers' Association in Ottawa, as well as three Directors' meetings and field days in Pontiac and St. Emile; The Quebec Forestry Associations Quinquennial meeting in Quebec; two Rouge River Valley Association field demonstrations; The Canadian Pulp and Paper Association, Woodlands Section, annual meeting in Montreal, as well as several Canadian Institute of Forestry, Champlain Section meetings; one meeting of the Montreal Farmers' Club to hear the Hon. Mr. Sauvé speak about A.R.D.A., and the Northeastern Forest Tree Improvement Conference at Pennsylvania State University. A seminar was held in April at Macdonald College to discuss with provincial extension foresters "Private forestry in relation to the A.R.D.A. agreements"; a seminar in Ottawa sponsored by the Centennial Council to study "Community Improvement and Rural Beautification" in which the following resolution with regard to the "maintenance and protection of wildlife habitat, flora and natural areas" was drafted by the Department:

"All around us we are witnessing developments taking place in the form of more and straighter highways, widespread use of herbicides and pesticides, the straightening of drainage ditches and stream beds, bulldozing for housing and resort establishment and shopping centres, and clean field and fence-line cultivation, to mention a few. These developments threaten the complete destruction of the most scenic parts of our natural environment, those parts that are most attractive to tourism and residents alike, and essential for the preservation of our native flora and fauna. Be it resolved that the maintenance and protection of wildlife habitat, flora, and natural areas in all rural districts be given serious and immediate consideration. These two areas of interest are complementary. The preservation of small portions of fence-line growth of native shrubs and trees, natural woodlands, open pastures and wooded edges, and pieces of marshy or poorly drained lowland, are all premium wildlife habitat for many kinds of birds and animals. These areas also form unique sites for the preservation of the native flora and provide a welcome scenic contrast to the open or cultivated countryside."

Other meetings attended which relate to the work of the Department included six District and Provincial Council meetings to report on Conservation; judging at the Montreal Science Fair, the Diploma Course Revision Committee meeting, and the Canadian International Paper Company's Harrington Forest Farm field day.

Additional meetings and time have been taken up in pursuing the interests of the Association and following up the many research activities in the Morgan Arboretum. These are too numerous to outline in detail but the herbicide trials; the natural resources educational films and film strip meetings and advisory work; the holding of an evening lecture for the Canadian Audubon — sponsored bald eagle research, and study and recommendations regarding natural areas protection and development are worthy of mention.

Brief regarding revised forestry legislation

A brief prepared by Mr. J. D. MacArthur was submitted to the Minister of Lands and Forests in view of the forthcoming revision of

forestry legislation by that Department. The brief focussed attention on the problems of private forestry in Quebec. It emphasized that woodlot forestry was an important source of income in the agricultural and settled regions. Much of this land that is now totally unproductive is potentially the most productive in the Province. The farms proximity to markets, to labour and ease of access, all merit more attention to its conversion to forestry now that it has been abandoned for agricultural usage. These lands are the only major source of valuable tolerant hardwood timber in Quebec and improved forestry practices would be most beneficial in the long term to industry, residents and visitors. Despite their known potential these forests are the worst managed of all forests lands in the Province. They are frequently clear-cut and despite considerable educational effort little progress in forest management is being achieved. The present low return from woodlot management is not encouraging changes in land-abuse practices that were fostered by plentiful supplies of wood in the past and a short-sighted forest policy.

It is felt that these abandoned and poorly forested lands could play an important role in the rehabilitation of the rural economy which is now in serious trouble. An important, long-term solution to rural reorganization is to be found in better use of these underdeveloped or mis-used resources. The rehabilitation of the rural population and the revitalization of lands in southern Quebec should be concentrated on abandoned farms and mis-used forests in a serious effort to overcome the basic conflict between the individual's short-term viewpoint and the necessarily long-term needs of sound forestry practices. As a basis for planning a 13-point programme aimed at improving the climate for private forestry in Quebec was drawn to the attention of the Minister. In brief, the highlights of this programme are as follows:

1. A complete inventory of land available for forestry production.
2. Rating of this forest land in terms of productivity.
3. Revision of tax structures to remove undue tax burdens on forestry.
4. Assistance for woodlot development similar to that provided for agriculture, in particular for woodlot improvement, roads, marketing and management planning.
5. Increased assistance for reforestation of old fields and extension of the period of property tax freeze to 50 years.
6. Low interest loans for forest management improvements.
7. The use of growing stock to secure loans to reduce woodlot liquidation by clear-cutting.
8. Provision of fire insurance for woodlots and better protection services in rural areas.
9. Expansion of educational effort and stepped-up extension programme to reach all interested woodlot owners.
10. An industrial programme to provide incentives to wood producers.
11. Expansion of existing wood-using industries and establishment of new ones where feasible.
12. Conduct and support research and development in marketing, better

wood utilization, sugarbush and woodlot management, reforestation and multiple use management.

13. A direct action programme of reforestation of abandoned lands of good forestry capability (i.e. land capability class 4 or better) as an unemployment relief scheme which would require a minimum of retraining.

Woodlot ownership survey

An important survey of attitudes towards woodlot management supported by a Department of Forestry extra-mural research grant has been underway this year. Mr. Richard A. Lord, a 1964 graduate from the Faculty of Forestry at the University of New Brunswick, has been carrying out the work and the results to date are as follows:

"An intensive survey to investigate the characteristics of woodlot owners and their attitudes toward woodlot management was commenced in May 1964 in the Counties of Soulanges and Huntingdon in southwestern Quebec. The counties are considered separately for purposes of comparing attitudes and practices which prevail in areas which differ considerably in the ownership pattern and the extent and importance of the forest. A questionnaire has been prepared and responses obtained from both resident and non-resident woodlot owners. The survey of Soulanges county is complete and field work in Huntingdon is nearing completion.

"In Soulanges county, of the total 621 census farms, 268 were reported to include 3 acres or more of forest land. An additional 40 wooded properties were identified as either non-farm or non-resident holdings, giving a total of 308 individual forest properties. The woodlots averaged less than 20 acres in size ranging from 3 acres to a maximum of 500; total woodlot area was approximately 6,000 acres. Plans called for a 100% survey of both resident and non-resident owners. On completion of the field work 202 residents and 16 non-residents had replied to the questionnaire.

"Initial assessment of the results in Soulanges county are summarized as follows: More than 20% of the woodlot owners reside away from their properties, many of them are living in urban areas outside the county. This trend is most pronounced along the border of Lac St. Louis where property values have increased rapidly and land is being held for real estate speculation and investment. While 40% of the tenure has remained unchanged in the last 40 years, nearly 20% of the properties have changed hands in the past 5 years. Farms are being abandoned as interest in agriculture declines. Nearly 50% of the farm operators now supplement their income with at least seasonal employment away from the farm; half of these owners report their off-farm income exceeds their return from all their agricultural enterprises including the woodlot.

"These conditions have a strong effect on the attitudes and practices of the owners with respect to their woodlot. In general, the usefulness of the woodlot from the viewpoint of most owners is declining rapidly. The fact that most of the woodlots are heavily cut back, unprotected, or in poor condition, is indicative of this

attitude. The survey also indicates that the active farm operators are in the older age brackets, as the younger men either leave the farm permanently, or work away by day. A scarcity of labour is the most frequent reason given for the lack of interest in the woods. On many properties oil has replaced firewood as the principal fuel, and lumber for buildings is purchased. The alternative of hiring cutters, or of giving up lucrative off-farm employment to work in the woods is unacceptable to the owners. While 75% of the owners continue to cut some firewood annually, both this percentage, and the quantity harvested, is decreasing. Only 10% of the owners report periodic sales of woodlot products and maple syrup provides the largest source of cash income, followed by sawlogs, pulpwood and pickets. 20% of the owners interviewed reported some degree of exploitive clear-cutting in the past 5 years, and many of these properties have been stripped of all merchantable timber.

"50% of the owners reported some measures designed to protect or improve their woodlots. In most cases improvements were limited to the removal of dead or dying trees during the annual firewood cuts. Only a few owners have taken any precautions to prevent grazing; the general feeling is that the woodlots are more valuable for shelter than for any forest crop. Reforestation has been limited to a total of some 35 acres on eleven different properties. The reasons most commonly given by those owners who have made no attempt to improve or protect their woodlots were lack of time (29%), and the belief that no improvements were possible (27%). Another 18% of the owners felt that attempts at improvement would fail to yield a profit for the time invested.

"Field work in Huntingdon county began early in 1965. The county differs from Soulanges in its greater overall size, more extensive forested area, in its generally larger and more prosperous farms and higher degree of woodlot utilization. By comparison, some 800 forested properties are included among the 1,133 census farms in the county; 78 of these are owned by non-residents. Woodlots averaged nearly 30 acres in size, ranging from 3 acres to several over 500 acres.

"For reasons of time, a sample of 160 resident owners and 78 non-residents, 22% of the total, was selected for study. The sample was selected on the basis of property size and location within the county with emphasis on the larger holdings. By the end of April 95% of the resident owners had been interviewed. A final report containing details and analysis of the results from both counties is in preparation."

Community service

The Arboretum and office continues to serve the local community in a multitude of ways and the increasing use of the property for outdoor recreation is gratifying despite the increased hazards of protecting the property from fire, theft and vandalism. Fortunately this past year there was very little damage from these agencies. Much credit for this goes to our small Arboretum work staff lead by Bob Watson. Mr. Watson reports an increase in gatekeeping activity and a record of 4,344 visitors

in 1964-65 as compared with 3,434 in 1963-64, and 1,458 in 1962-63. This number does not include the many educational groups that visit during the week days, such as schools, scouts, guides, horticultural societies and garden clubs, to name a few. Another way in which Mr. Watson has contributed to the life of the community is the fine job he has done with the Intercollegiate Woodman's Teams. With him as coach and mentor for the past three years the Macdonald College woodsmen have become recognized as a potent force in intercollegiate competitions. His skill and enthusiasm for this work has kept the student interest alive in axemanship, Swede-saw and cross-cut sawing, as well as mechanical saw use, fire-lighting, pulp-throwing, canoeing and snowshoeing to mention a few of the many intricate skills required of contestants in such events. A fine coaching effort this year assisted Macdonald College's regaining the Sandvik Trophy for Swede-sawing from Paul Smith's College of New York at the Winter Carnival competition. Fifteen teams competed and the meet champions were the University of New Brunswick with Macdonald College a close second, and Paul Smith's College third. Mr. Watson is to be congratulated for a fine effort and the sportsmanlike manner in which his teams operate.

Yours faithfully,

A. R. C. Jones,
Chairman,
Dept. of Woodlot Management

May 31st, 1965

Form of bequest

The Directors wish to remind friends of the Morgan Arboretum and Woodland Development Association that the financing of the Association's activities is dependent on their generosity to provide funds to maintain and expand conservation in Canada.

It is suggested to those in a position to do so, the addition to their will of a particular legacy in the following form:

"I bequeath to the Morgan Arboretum and Woodland Development Association, Macdonald College, as a particular legacy, and free from all succession and death duties of any kind, the sum of \$....."

Inquiries concerning bequests, other gifts to the Association, or additional information, should be addressed to:

The Secretary-Treasurer,
Morgan Arboretum & Woodland Development Ass'n.,
Macdonald College,
P.Q.

